

MISSION OPERATIONS AND DATA SYSTEMS DIRECTORATE

**Renaissance Team
Management Plan**

Revision 1

February 1995



National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

Renaissance Team Management Plan

Revision 1

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Preface

This management plan is controlled by the Systems Engineering Office (SEO) (Code 504) and approved by the office chief. All recommended changes are to be submitted in writing through a Renaissance Team member. Resolution of the suggestions will be communicated back to the source via the same team member. The management plan will be updated periodically as required. Questions and proposed changes concerning this document shall be addressed to:

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Abstract

Over the past fiscal year (1994), Renaissance has evolved from initial concepts to the beginnings of implementation. With this evolution, the engineering processes and methodologies have progressed and solidified to the ideas presented in this document, *Renaissance Team Management Plan. Revision 1*. Of note are the following changes:

- New working structure
- Use of action teams to resolve specific problems or issues

Keywords: *building blocks, centers of expertise (COEs), reengineering, repository, standards*

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1. Introduction

The Reusable Network Architecture for Interoperable Space Science, Analysis, Navigation, and Control Environments (Renaissance) is a new approach to providing ground data processing systems to support Code 500 customers in a cost-effective, timely manner. This new approach redefines the architecture of the systems developed by Code 500, the way in which these systems are developed, and the role Code 500 plays in the operation of the systems.

The Renaissance approach is based in the concept of using reusable *building blocks* (hardware, software, and/or firmware) that can be integrated and enhanced to support a single mission or mission series [such as Small Explorers (SMEX)]. These building blocks incorporate workstation, file server, and local area network (LAN) technology and widely accepted industry standards. The design of building blocks is focused on mission needs rather than on facility boundaries.

Use of existing platforms and commercial LAN technology provides a relatively low-cost hardware base. Over time, component reuse will further reduce the cost of and schedule for developing a system and increase system integrity and reliability. At the same time, this approach provides the ability to customize the resulting system to meet specific user requirements.

The system development approach for mission support is to establish a project development team composed of experienced personnel from each of the Code 500 disciplines [referred to as *centers of expertise* (COEs)]. Once the requirements for a project are defined, the project development team constructs a system by integrating the appropriate set of reusable building blocks with whatever additional new components are required to satisfy mission requirements.

Finally, Code 500 continues to offer as a service the operation of the system for the customer. On the other hand, if the customer wishes to operate the system, the Renaissance approach permits that as well. The Code 500 role will thus shift from primarily operating systems that it builds to using our expertise to develop customized systems for our customers and operating these systems if that is the best approach.

The Renaissance approach provides all Code 500 support for any given mission. While the primary intent of the new approach is to develop systems that are contained within a single facility for each mission, the architecture is flexible enough to allow the system to be geographically dispersed if that best satisfies customer requirements. Such flexibility allows Code 500 to be totally responsive to the needs of its customers.

This management plan covers the second year of the first phase of Renaissance activity and specifically defines the goals and tasks of the Renaissance Team. It is intended to be read and used by those intimately familiar with Renaissance activities and consequently does not contain historic information.

The following references provide Renaissance background information:

- Mission Operations and Data Systems Directorate (MO&DSD), Dale Fahnestock, *Renaissance—A New Approach to Ground Data Systems*, November 18, 1993
- ASG Team 1 Report, *Future Mission Operations and Data Systems Directorate Architecture and Ground Segment Operations Concept*, April 1993
- Systems, Engineering, and Analysis Support (SEAS) Systems Management Office (SMO), *MO&DSD Ground Data Systems (GDS) Architecture Concept Study Presentation*, December 18, 1992
- SEAS SMO, *MO&DSD GDS Architecture Concept Study Presentation Supplementary Material—Appendixes*, December 18, 1992
- MO&DSD, *Renaissance Architecture for the ACE Mission Ground Data System*, Draft, August 1994
- MO&DSD, *Renaissance Standards*, Draft, August 1994
- MO&DSD, *Renaissance Operations Concept Document for ACE*, Draft, August 3, 1994
- MO&DSD, *Renaissance User Services Transition Plan*, Draft, September 6, 1994
- MO&DSD, *Systems Engineering Plan*, Baseline, November 10, 1994

These documents, in addition to procedures to access the Renaissance file server, can be obtained from your organization's Renaissance Team (RT) member(s).

The Renaissance file server (renaissance.gsfc.nasa.gov) is used as the central repository for all technical information, including documents at various stages of production, memorandum, working papers and reports, specifications, presentation slides and supplemental handouts, engineering drawings not already included in other works, and other technical information. The server is a Macintosh computer running the A/UX (Unix) operating system, which is then running the Macintosh (finder) System 7 operating system. This configuration provides standard Unix access and System 7 (finder) access methods. Read-only access is provided via several methods:

- Shared folder from Macintosh chooser
- Mosaic access
- Lynx access
- Telnet or file transfer protocol (ftp) access

2. Team

The purpose of the first phase of Renaissance activity is to fully define the new architectural approach for Code 500 flight project ground support systems and to begin the transition to this new approach. The Renaissance Team will define information sufficient for the Code 500 divisions to develop the building blocks and will plan the transition to the new approach. Team activities will concentrate on all "technical" aspects associated with the new architectural approach. The Renaissance Team will also define in this phase the details of the subsequent phases of Renaissance activity. However, the process used to build the Code 500 ground systems (e.g., configuration control, responsibilities, authority, management structure, etc.) will be developed by **TBD**. The Renaissance Team and **TBD** will work closely in developing both aspects of the new way of doing business to ensure completeness and consistency.

The Renaissance Team is chartered to specifically meet four goals:

1. Identify the building blocks needed to make the Renaissance approach successful.
2. Identify the standards and define the methods necessary to make the development of these building blocks successful.
3. Develop a plan for transitioning Code 500 to the new architectural approach.
4. During the transition period, work with mission teams to identify specific architectures for support of near-term missions, using the new building blocks whenever feasible.

The Renaissance Team is composed of a team leader and a number of senior engineers representing various Code 500 divisions and offices. Supporting this team are five standing working groups with overall responsibility for conducting the technical work, as shown in Figure 2–1. Those working groups then spin off small action teams as needed to address specific technical issues.

The Renaissance Team Leader reports directly to the Chief of the Systems Engineering Office (Code 504) and derives authority from the Director of Code 500, with oversight by the Code 500 Assistant Director for Systems Engineering. The Renaissance Team Leader is responsible for overall management activities, including development of the management plan, preparation and monitoring of the budget, overall technical direction, and reporting of status and progress to appropriate levels of management. The Renaissance Team Leader is also responsible for working with the divisions and offices to receive personnel support required to achieve the Renaissance Team goals and objectives.

The Renaissance Team itself will report to the **TBD**, which will provide overall guidance and recommendations. The Renaissance Team meets weekly, as required, to discuss general status and issues that cannot be handled within individual working groups.

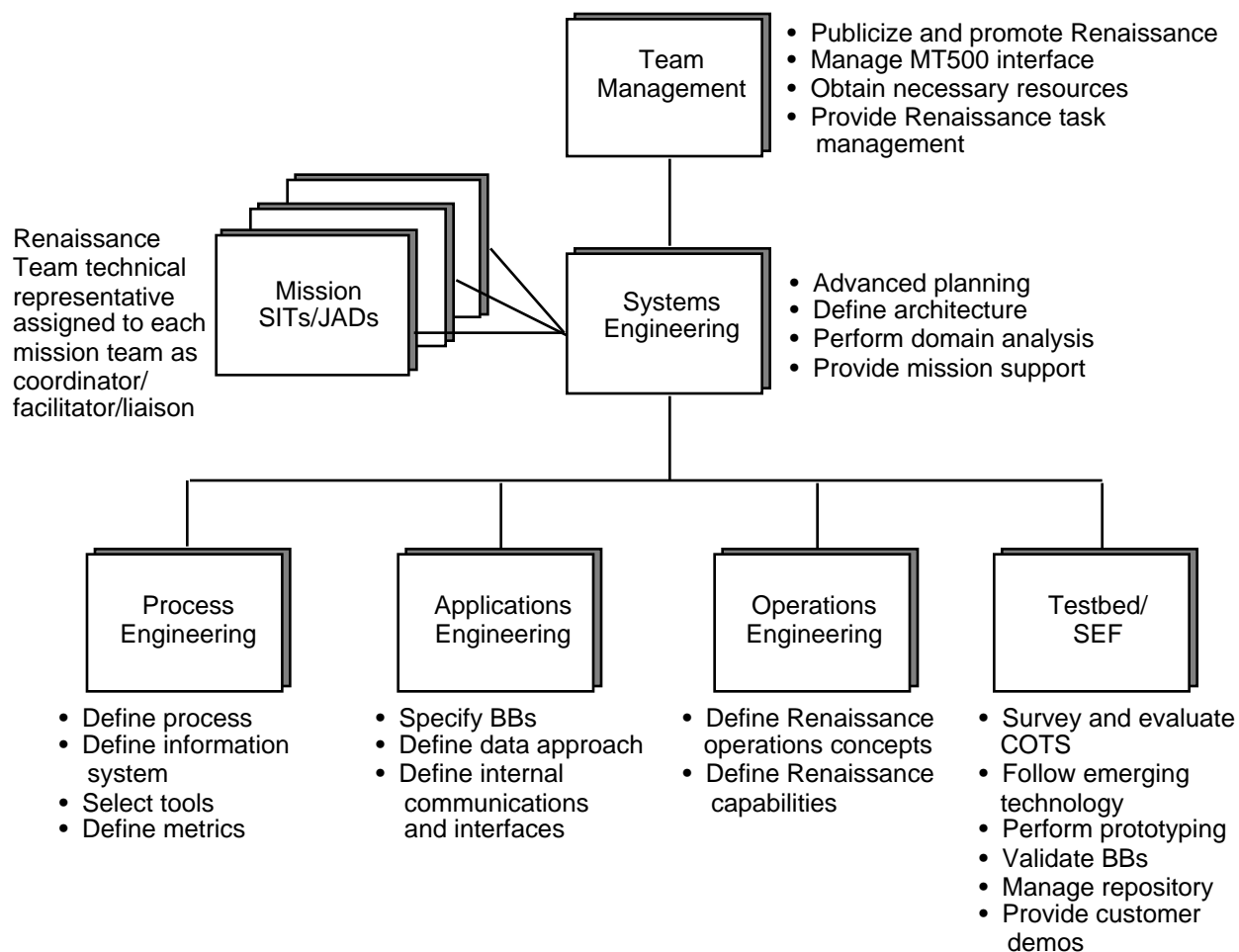


Figure 2–1. Renaissance Working Structure

Renaissance Team members are responsible for performing the technical aspects of the team charter, including soliciting other support from within their own divisions and offices as required. They receive direction only from the Renaissance Team Leader or designee on matters relative to Renaissance activities.

Each working group will determine its own meeting schedule to discuss status, issues, and plans. These working group meetings will be scheduled to avoid interference with each other so that all interested parties may attend. In addition, a working group may schedule additional working meetings primarily for the core members of the group.

The working groups are chaired by one or more Renaissance Team members, with additional membership of interested individuals from the divisions and offices as requested by the divisions/offices and approved by the Renaissance Team Leader. The working groups are small in number.

Action teams are small (maximum six people), informal splinter groups formed to resolve specific activities or issues. An action team is identified by a charter and specific products, as well as specific start and end dates; the group is disbanded on completion of the activity. The group has a facilitator who is not necessarily a Renaissance Team member. Recommendations are brought by the action team to the parent working group for approval. Action teams will establish their own schedules.

3. Products

The primary products of the Renaissance Team will be the documents described in this section. Section 5 includes the schedule for review and delivery of these documents. The Renaissance Team and its working groups will perform configuration control of all documents. A Renaissance Team member must sponsor any recommended change to a document, though the recommendation itself may originate from outside the Renaissance Team and working group structure. The sponsoring Renaissance Team member will work the resolution of a recommendation with the submitter. Recommendations may be made at any time, in addition to following scheduled document releases and review presentations.

The Renaissance products can be categorized into two groups: plans and processes, and architecture descriptions and mission support documentation, as represented in the product trees shown in Figures 3-1 and 3-2, respectively. The products contain information at different levels of detail and are arranged hierarchically in the tree structures to depict the relationships between the documents. Figure 3-3 is provided to illustrate the relationships and dependencies of the products to one another.

Table 3-1 shows the working groups responsible for development and update of these products.

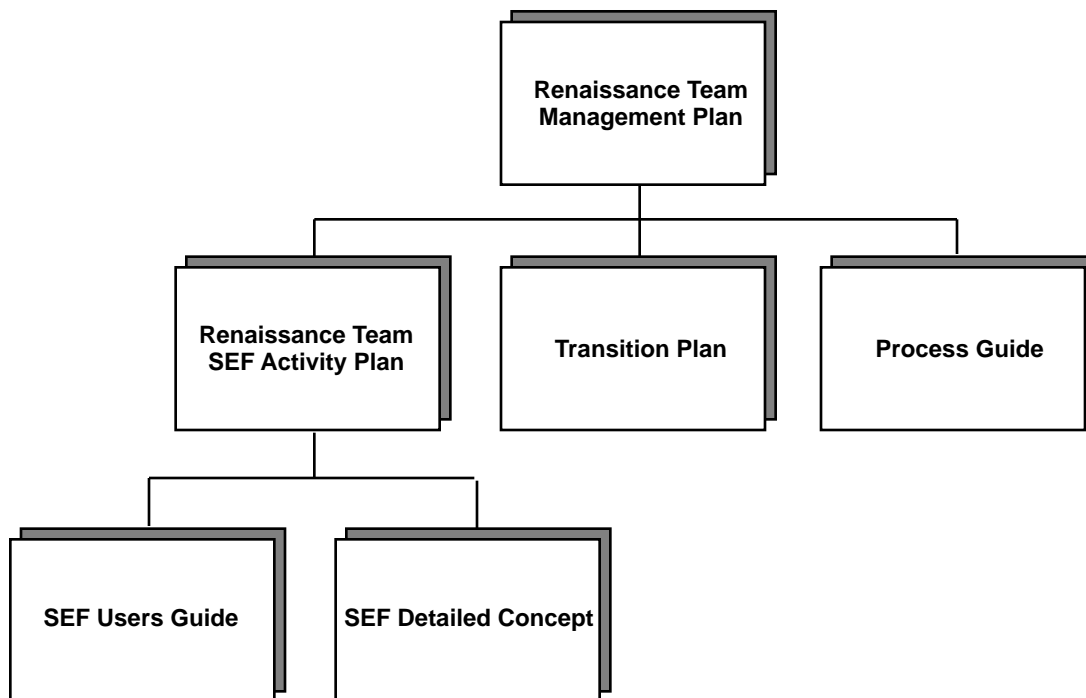


Figure 3-1. Plans and Processes

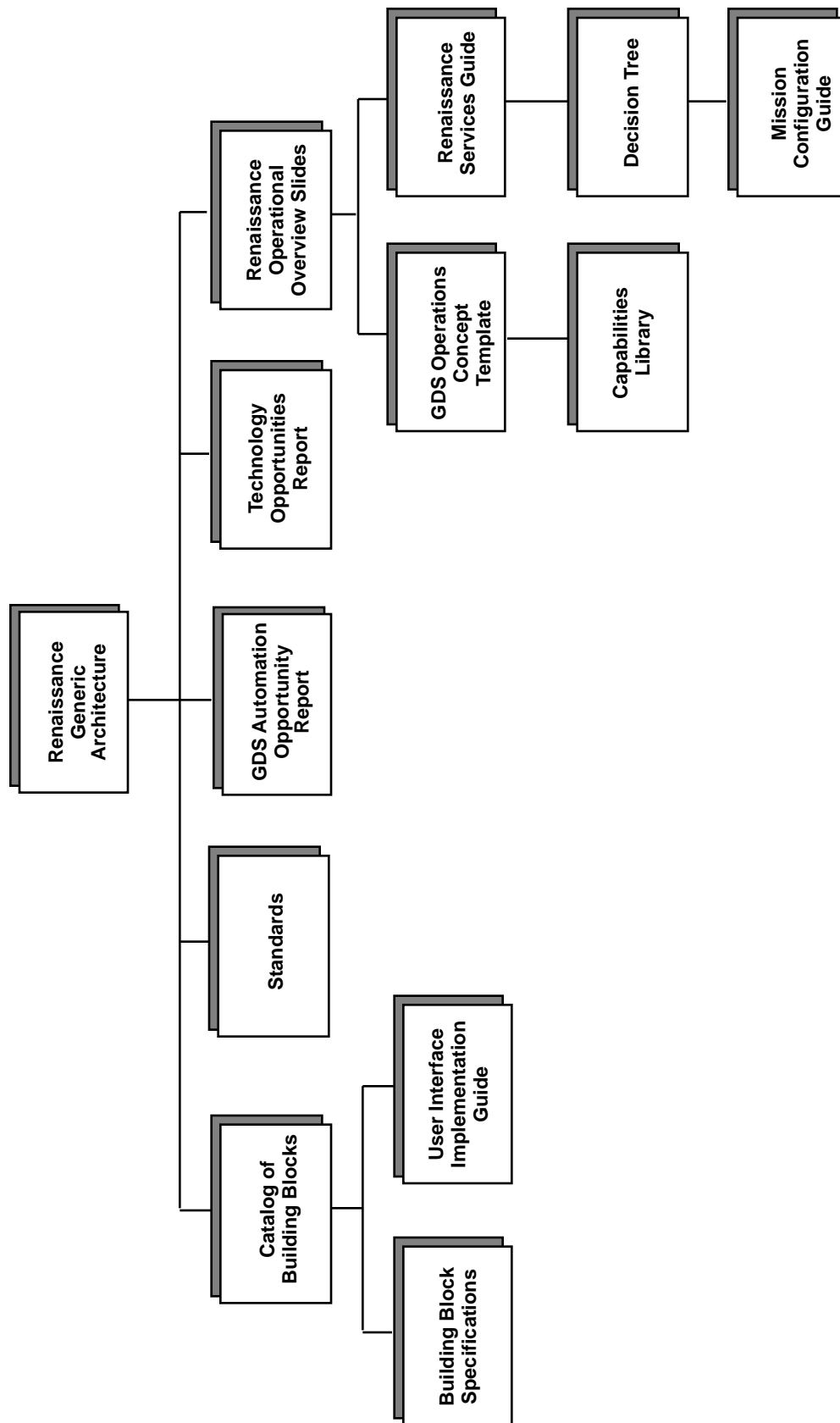


Figure 3–2. Renaissance Architecture Descriptions and Mission Support Documentation

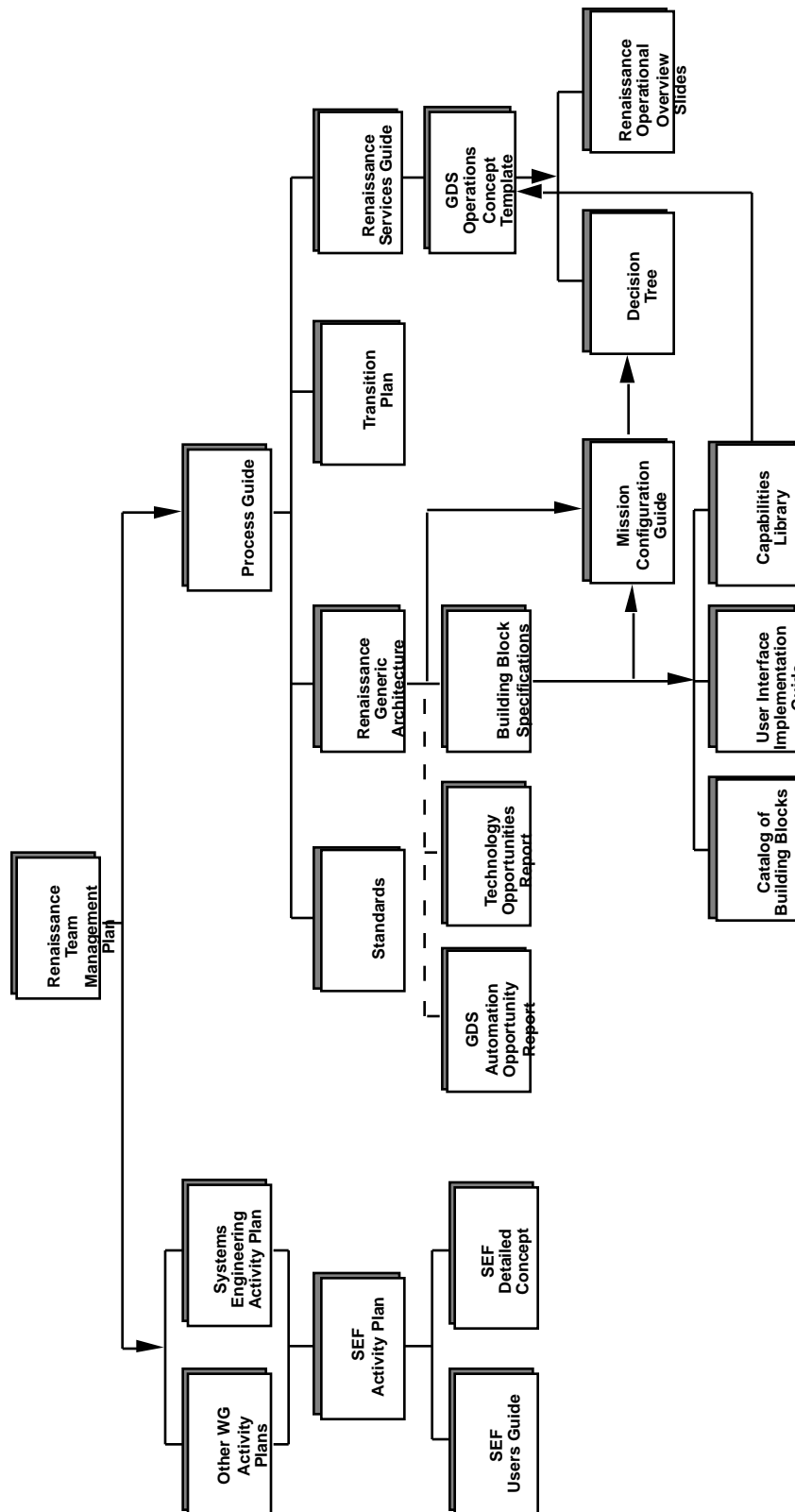


Figure 3-3. Document Dependency Relationships

Table 3-1. Responsibility for Products

Working Group	Products
Management	<i>Renaissance Team Management Plan</i>
Systems Engineering	<i>Renaissance Generic Architecture Standards</i> <i>Transition Plan</i> <i>Renaissance Services Guide</i> <i>Mission Configuration Guide</i>
Process Engineering	<i>Process Guide</i>
Applications Engineering	<i>Catalog of Building Blcoks</i> <i>Building Block Specifications</i> <i>User Interface Implementation Guide</i>
Operations Engineering	<i>GDS Automation Opportunity Report</i> <i>Technology Opportunity Report</i> <i>Renaissance Operational Overview Slides</i> <i>GDS Operations Concept Template</i> <i>Capabilities Library</i> <i>Decision Tree</i>
Systems Engineering Facility (SEF)	<i>Renaissance Team SEF Activity Plan</i> <i>SEF Users Guide</i> <i>SEF Detailed Concept</i>

3.1 Plans and Processes

Renaissance Team Management Plan

- Purpose: *Renaissance Team Management Plan, Revision 1*, documents the purpose, structure, and products of the Renaissance Team. This will be a continually evolving document during Phase 1 of Renaissance activity.

Renaissance Team Systems Engineering Facility (SEF) Activity Plan

- Purpose: *SEF Activity Plan* presents an overview of the SEF concept, presents the layout of the SEF facility (initially referred to as the Renaissance testbed), and describes the prototyping activities that will be accomplished in the SEF. Appendices to the document list activities recommended by Renaissance Team members, those selected for the initial SEF work, and the schedule for their implementation.

Systems Engineering Facility (SEF) Users Guide

- Purpose: *SEF Users Guide* defines, for prospective users, the mechanisms for establishing new activities in the SEF. A brief document, the *SEF Users Guide* will outline the process for defining and presenting new activities for consideration, establish the contacts for acquiring SEF resources, and define the SEF facility usage guidelines.

Systems Engineering Facility (SEF) Detailed Concept

- Purpose: *SEF Detailed Concept* presents a complete description of the SEF concept and breakdown of each of the four primary SEF conceptual areas namely:
 - Repository
 - Building Block Validation and Integration (BBVI)
 - Architecture Engineering and Testbed (AET)
 - Mission-Specific Support (MSS)

The functions within each primary SEF area, the relationships among areas, and the resources available to support these areas will be described. Management information such as schedule, budget, and resources will be presented separately for the purposes of outlining the implementation issues for the complete MO&DSD Systems Engineering Facility.

Transition Plan

- Purpose: *Renaissance Transition Plan* provides a long-term guide to implementation plans for Renaissance GDSs. It describes the high-level features of the planned Renaissance releases and the dates for each release. Additionally, it lists the missions expected to use each release. Both the draft and final versions will describe the following relevant features:
 - Developed components
 - COTS integration
 - Mission allocations
 - Release schedule(s)

Process Guide

- It is proposed that there be two major online documents on how we do business in Code 500:
 - *System Management Plan*—High-level management policy guidelines
 - *Process Handbook*—Details processes that support policy guidelines

- Contents:
 - Description of process to change the existing development process (constant evolution)
 - Domain life cycle
 - Mission-specific life cycle
 - Configuration management (Note: This section will be broken out as a separate guide if needed.)
 - Information system to support the processes
 - Tools selected to aid life-cycle processes
 - Definition of metrics to be used

3.2 Architecture Descriptions and Mission Support Documentation

Renaissance Generic Architecture

- Purpose: *Renaissance Generic Architecture* describes the domain architecture used to integrate building blocks and provide the foundation for mission architectures. The architecture provides the high-level design and interface specifications that partition GDS functions, define their interfaces, and link the hardware, software and operations aspects into a whole. One generic architecture document will be prepared for each (first and second) generation of the architecture.
- Contents:
 - Summary of context and operations options
 - Capabilities and implementation rationale
 - Functional capabilities
 - Security and availability issues
 - Hardware options
 - Software architecture
 - Overview of domain functions and interfaces
 - Interface definition and implementation,
 - Functional building blocks
 - Data architecture
 - External interfaces

Standards

- Purpose: *Renaissance Standards* provides a foundation for development of the Renaissance generic architecture and building blocks and for the mission ground data systems (GDSs) developed from them. The standards provide the essential stable, common element that enables mission configuration flexibility, high levels of building block reuse, and use of both commercial off-the-shelf (COTS) hardware and software.

A draft standards document was developed in the initial stage of Renaissance in fiscal year (FY)94. The update to the *Renaissance Standards* document is aimed at immediate or current systems. It will have the same structure as the existing draft but will add details regarding Distributed Computing Environment (DCE) and Spec 1170; data standards [e.g., National Space Science Data Center (NSSDC)]; and possibly user interface standards.

An update for the later architecture version will add Common Object Request Broker Architecture (CORBA) standards and other software backplane standards.

Catalog of Building Blocks

- Purpose: This document provides a description of each Renaissance element and subelement building block and gives an overview of how these fit together into the generic Renaissance architecture. The initial versions of this document for the first-generation Renaissance architecture will draw on previous work on various relevant legacy systems, as well as on Renaissance architecture work with the Advanced Composition Explorer (ACE) mission. It is expected that this document will eventually be completely revised to be consistent with the second-generation Renaissance architecture, once it is defined.
- Contents:
 - Introduction to and overview of the generic Renaissance architecture concept
 - Overview of the first-generation Renaissance architecture and the structure of each of its subsystems in terms of element-level building blocks
 - Summary list of all (element and subelement) building blocks in the first-generation architecture
 - Full catalog database entry for each building block (including references to more detailed specification and design documentation)

Building Block Specifications

- Purpose: The detailed specification of the functionality, design, and tailoring approach for each building block will be produced by the building block implementors and delivered with the implemented building block. These specifications (or pointers to existing documentation of them) will be collected as building blocks are implemented and referenced in *Catalog of Building Blocks*.

User Interface Implementation Guide

- Purpose: *User Interface Implementation Guide* describes the style principles for a consistent look and feel across Renaissance user interfaces and the guidelines for implementing new user interface software.

GDS Automation Opportunity Report

- Purpose: *GDS Automation Opportunity Report* identifies time-consuming manual operations performed by Renaissance GDS MOTs that could possibly be streamlined or improved with new technology.

Contents:

- Abstracts of candidate operator activities based on operational scenarios with associated suggestions for technology replacement

Technology Opportunity Report

- Purpose: This report identifies new technology that may provide Renaissance the ability to support customers in ways that had not previously been feasible.

Contents:

- Abstracts of candidate technologies with associated descriptions (including operational scenarios, where appropriate) of new services that could be provided to Renaissance customers

Renaissance Operational Overview Slides

- Purpose: These slides provide examples of Mission Operations Team (MOT) usage of the Renaissance architecture and COE operations support. The slides will later be turned over to the Process Engineering working group for incorporation into a Renaissance marketing presentation.

Contents:

- Diagrams that show pre-event, event, and post-event activities with human/machine boundaries

GDS Operations Concept Template

- Purpose: Mission teams will select from applicable items in the capabilities library as much as possible to populate their operations concept document. The GDS Operations Concept Template provides one way to organize generic Renaissance-supported scenarios, COE support, and mission-specific operations concepts and scenarios. This template will fit into the mission operations concept document created by 50X.

Contents:

- GDS mission operations concept outline with areas pertaining to generic Renaissance operations concepts
- Structure for mission-specific operations concepts
- One paragraph in each section to describe the expected contents that the mission will provide or select

Capabilities Library

- Purpose: The *Capabilities Library* document provides mission teams with a mechanism to determine the following:
 - Renaissance blocks that will support a particular operational scenario
 - Renaissance blocks that will require modification to support a scenario
 - New building blocks that will be needed to support a scenario
 - Spacecraft constraints imposed by building blocks in order for those building blocks to support a scenario
 - GDS user constraints imposed by building blocks in order for those building blocks to support a scenario
 - Renaissance generic operations concepts that a mission should choose for their mission-specific operations concept document

The initial versions of *Capabilities Library* will take the form of Integration Definition for Function Modeling (IDEF0) diagrams and textual descriptions and will later be cataloged in an information system defined by the Process Engineering working group.

Four other documents being prepared by the Operations Engineering working group (*Decision Tree*, *GDS System Operations Concept Template*, *Renaissance Operational Overview slides*, *Technology Opportunity Report*,) are dependent on *Capabilities Library*.

Contents:

- Operational scenarios that depict functions and functional relationships of GDS users, Mission Operations Center/Science Operations Center (MOC/SOC) system components, data, and products
- Short descriptions and constraining requirements of each Renaissance building block associated with an operations scenario

Renaissance Services Guide

- Purpose: *Renaissance Services Guide* is a "starter kit" for missions; it provides essential information to customer missions about the services provided for them by Renaissance, as well as a summary of the products and services, the means of acquiring detailed information about these, and points of contact.
- Contents:
 - Overview of Renaissance products and services
 - List of products and services
 - Guide to detailed documentation
 - List of points of contact for Renaissance

Decision Tree

- Purpose: *Decision Tree* provides the GDS advanced planner with a tool in the mission concept phase and pre-phase A to prompt the advanced mission analysis team with questions concerning spacecraft design issues impacting Renaissance building block reusability and COE operations support. Different architecture alternatives can be derived by systems-engineering-based decision tree paths.

Contents:

- General mission support questions with associated impacts to Renaissance building blocks and COE operations support (As answers become available, more detailed questions narrow the applicability of Renaissance building blocks based on spacecraft implementation decisions and operations requirements.)

The first draft will comprise working notes that the Capabilities Library action teams accumulated on spacecraft-dependent features of Renaissance building blocks and scenarios. The preliminary release will also include GDS user constraints.

Mission Configuration Guide

- Purpose: *Mission Configuration Guide* provides technical information to support configuration of a mission system from Renaissance building blocks. This information provides details about compatibilities and standards for the components to ensure selection of compatible subsystems and to guide customization. Mission configuration options, as well as the relationships among the options are included:
 - Intercomponent relationships,
 - Related interfaces

- Relationships between hardware options and software
- Relationships between staffing needs and options
- Customization guidance

4. Approach

Figure 4–1 shows a conceptual framework for the functional services included in a GDS. The Renaissance Team has formed five working groups to address each of the major areas shown in Figure 4–1 from various engineering perspectives (see Figure 2–1, Renaissance Working Structure). These working groups are led by Renaissance Team members, with additional membership drawn from the appropriate divisions and offices (as discussed in Section 2). Each working group is to provide

- Milestone schedule for planned activities
- List of working group members and participants
- Specific Renaissance Team products as assigned
- Input to other working group products as requested
- List of all active action teams sponsored

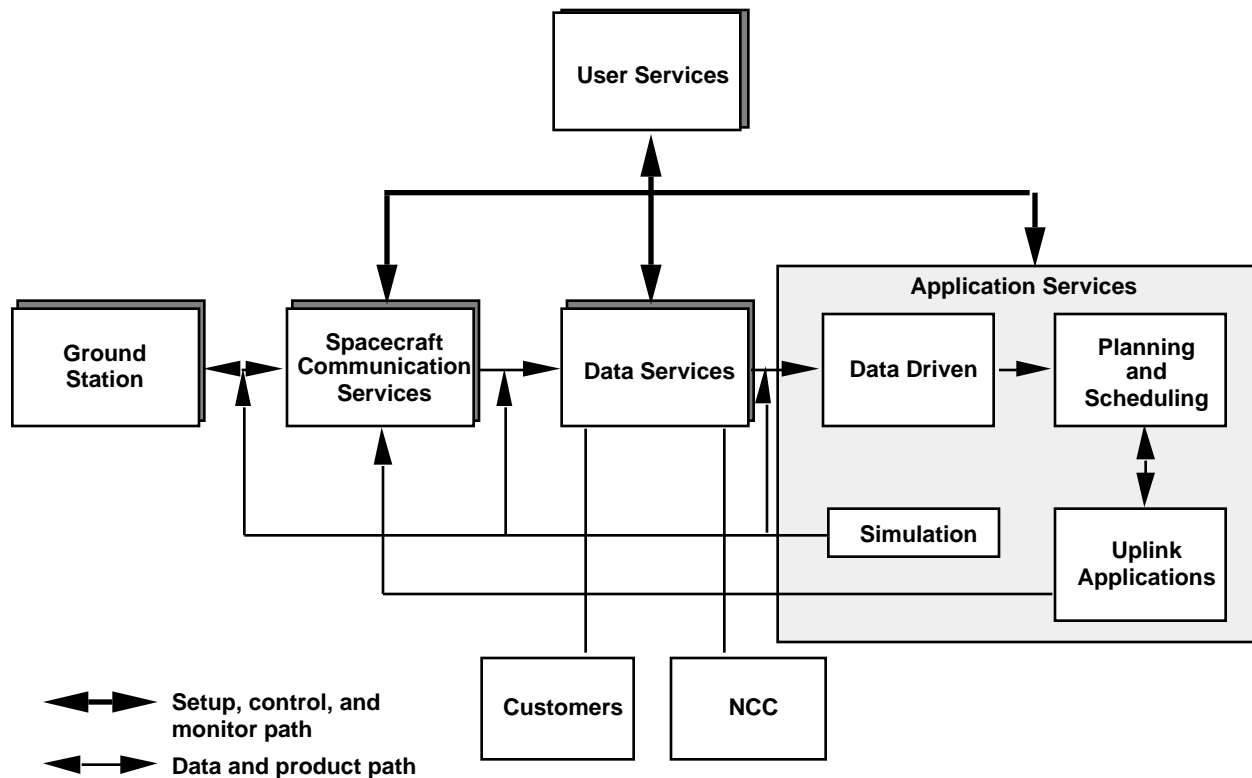


Figure 4–1. Conceptual Framework for Ground Data Services

The working groups, in turn, spawn action teams to address specific issues (also discussed in Section 2). Each action team is to provide

- Milestone schedule of planned activities (as appropriate)
- List of members and participants
- Specific products as chartered

The Renaissance Team will keep an online database of all activities, including working group schedules and status and action team leader, members, charter, start and end dates, products, schedules, brief status, and fever chart (green/yellow/red).

Table 4–1 shows the estimated contractor support required in direct support of the Renaissance Team for FY95. It is unknown how much civil service support will be required beyond the 10 people [approximately 6 onboard equivalents (OBEs)] currently supporting the effort. This will be a function of the number of action teams sponsored and their length of support, as well as the number of representatives assigned to the working groups by the Code 500 divisions and offices.

Table 4–1. FY95 Contractor Resource Estimates

Activity Supported	OBEs
Team Management	1.2
Systems Engineering	3.4
Process Engineering	1.5
Applications Engineering	3.5
Operations Engineering	1.5
Testbed/SEF	5.7
Mission Support	2.0
Total	18.8

The specific charters and prioritized activities for FY95 for each working group are provided in the following subsections.

4.1 Management

This document, *Renaissance Team Management Plan, Revision 1*, is the primary product of management activities. The following are the prioritized activities for FY95.

Highest Priority:

- Attain buy-in from MT500 on new Renaissance process
- Bring division activities in line with Renaissance
- Obtain additional Renaissance resources to apply to missions (in particular SMEX-4 and -5)
- Update Renaissance management plan (relationships and boundaries)
- Establish new process and plan for overall Renaissance Team coordination and management (Wednesday meetings).

Medium Priority:

- Publicize Renaissance
- Develop marketing plan for Renaissance

Low Priority

- Initiate task to identify Renaissance recommendations for supported products and services
- Provide training
- Work with 504 and 501/502 (or other offices) to ensure that we collect the right development costs

4.2 Systems Engineering

Systems Engineering provides oversight of the technical activities being performed by the various working groups and their actions teams. The charter is as follows:

- Develop and sustain the Renaissance generic architecture
- Provide the technical guidance and materials to support an effective integration of Renaissance GDS products and services
- Provide a technical interface to missions to support advance planning and mission GDS specification and implementation

The primary products of Systems Engineering activities are the standards document, the Renaissance generic architecture document, mission configuration guidelines, Renaissance services guide, transition plan, and products for SMEX, Landsat, and Earth Observing System

(EOS). Additionally, the *Systems Engineering Plan* details the scheduled plans for the working group.

The following are the prioritized activities for FY95.

Highest Priority:

- Mission support
- Produce version 1 of the Jet Propulsion Laboratory (JPL)/Goddard Space Flight Center (GSFC) telemetry interface document
- Perform domain analysis
- Complete specification and architecture for SMEX-4 and -5 (January 1995)
- Propose new COTS GDS

Medium Priority:

- Review ACE detailed specifications (December 1994/July 1995)
- Define Utopia architecture
- Conclude ACE cleanup
- Define Space Network/Ground Network (SN/GN) approach
- Assess emerging technology [e.g., DCE, common desktop environment (CDE)]
- Assess competition
- Develop approach to integrate Internet Protocol (IP) network management

Low Priority:

- Target architecture for different classes of missions

4.3 Process Engineering

Process Engineering is responsible for development and definition of the overall Renaissance processes. The charter is as follows:

- Define the process of changing process
- Define streamlined mission life cycle
 - Advanced planning and Renaissance relationship
 - Mission team and Renaissance relationship
 - Renaissance and COE relationship
 - Develop configuration management plan for building blocks

- Define domain engineering life cycle
- Facilitate processes internal to Renaissance and working groups
- Develop information system (infrastructure) and tools to support processes
- Develop metrics to allow for good decisions and tradeoffs

The process guide and configuration management plan are the primary products as part of Process Engineering activities. The following are the prioritized activities for FY95.

Highest Priority:

- Complete first baseline of Process Guide
- Develop process for populating capabilities database
- Develop skeleton outline for use by missions in their mission operations concepts
- Ensure that the process of cross-linking operations concepts to specifications is workable
- Ensure that the specified processes mesh with PACE effort, MOCA effort, and the directorate's systems engineering plan.
- Ensure that the processes mesh with directorate reorganization roles and responsibilities.

Medium Priority:

- Produce configuration management plan for building blocks
- Choose and facilitate metrics, including cost drivers

Low Priority

- Receive International Standards Organization (ISO) 9000 certification
- Document and maintain lessons learned (create database)

4.4 Applications Engineering

Applications Engineering is responsible for development of the generic building blocks. The charter is as follows:

- Define and specify generic building blocks
 - User interfaces
 - Data management
 - Communications
 - Domain applications
- Define internal building block interfaces

- Incorporate COTS products, as appropriate (using recommendations from Systems Engineering Facility)

A user interface implementation guide and updates to the generic building block specifications are the primary products to be produced by Applications Engineering. The following are the prioritized activities for FY95.

Highest Priority:

- Develop generic building block specifications
- Conclude ACE cleanup
- Define unified data management approach
- Define unified user interfaces
- Resolve IP issues [fanout box]

4.5 Operations Engineering

The Operations Engineering charter is as follows:

- Define Renaissance operations concepts
- Define generic Renaissance capabilities (from user perspective)
- Work with mission teams to develop new operations concepts and capabilities
- Coordinate development of building blocks and operations concepts
- Continually identify opportunities for automation of operations and cost reduction

Operations Engineering is responsible for creating and providing a Renaissance capabilities library against which mission advanced planners can map general requirements to Renaissance building blocks. From this mapping, the missions can establish the mission operations concept document. The following are the prioritized activities for FY95.

Highest Priority:

- Produce capabilities library (and operations concept)
- Update ACE operations concept for Renaissance (to be generic)

4.6 Systems Engineering Facility

The charter for the SEF is to

- Promulgate Renaissance concepts to provide a wider and better understanding of the Renaissance approach and culture
- Establish an infrastructure to ensure continuing Renaissance success by creating a facility as an enabling function to provide unique services not provided by (and sometimes not appropriate for) the divisions
- Centralize key Renaissance functions:
 - Manage MO&DSD building block repository and ground system architecture
 - Evaluate COTS and perform advance prototyping
 - Validate and integrate a generic architecture (proposed building blocks)
 - Enable rapid development of new mission architectures
 - Support new missions during early mission planning

An SEF users guide and a testbed plan are the primary products to be prepared by the SEF. The following are the prioritized activities for FY95.

Highest Priority:

- Complete specific near-term activities for testbed [packet processor (Pacor) II port to Hewlett-Packard (HP) platform, backplane prototype, prototype front-end processing software]
- Start up testbed (install and maintain new equipment)
- Assess emerging technology (e.g., DCE, CDE) (support Systems Engineering)

Medium Priority:

- Conduct market survey of COTS products
- Validate prioritization in IP network
- Validate IP performance over wide area network (WAN)

5. Schedules

Each Renaissance working group will contribute to the various products defined in Section 3. The team as a whole will integrate the work of the groups into complete products. Figure 5–1 shows the major milestones for the development and update of these integrated products for FY95.

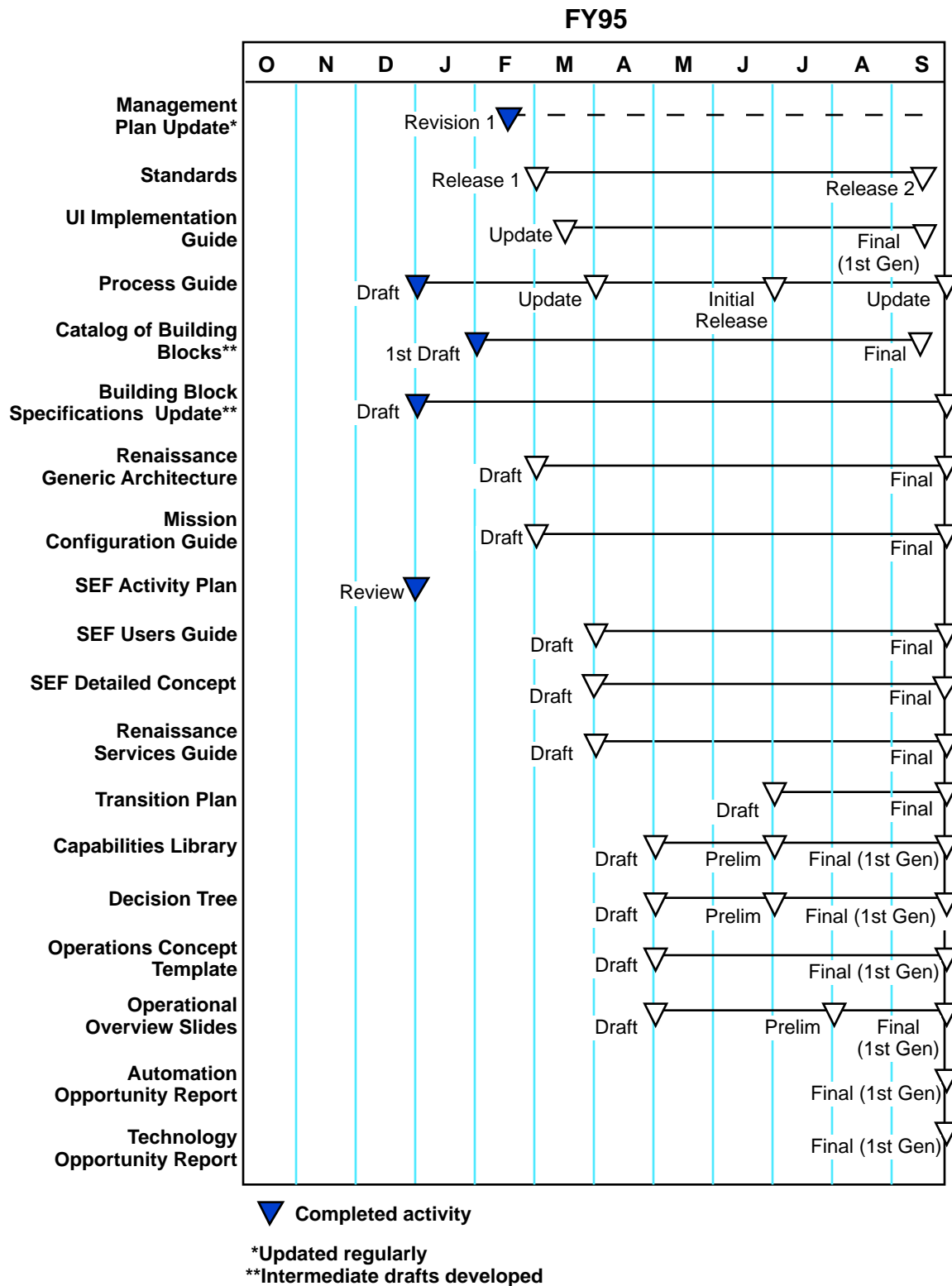


Figure 5–1. Renaissance Phase 1 Milestones for FY95

6. Information Flow

Achieving the Renaissance vision of an integrated Directorate architecture will require support from all divisions and offices and the coordination of a number of ongoing division efforts. It is thus crucial that there is a continuous flow of information in both directions between the Renaissance Team and the divisions. The following reporting mechanisms will be used to help ensure this flow:

RT Leader to Director of 500 and MT500	At minimum, every quarter
RT Leader to division chiefs	As needed or requested
RT members to division management	Monthly
RT members to division members	Continuously
RT Leader to Code O	As requested
Working Group schedules and status	Online
Action Team charters, schedules, status	Online

Acronyms

ACE	Advanced Composition Explorer
AET	Architecture Engineering and Testbed
BB	building block
BBVI	Building Block Validation and Integration
CDE	common desktop environment
COE	center of expertise
CORBA	Common Object Request Broker Architecture
COTS	commercial off-the-shelf
DCE	Distributed Computing Environment
EOS	Earth Observing System
ftp	file transfer protocol
FY	fiscal year
GDS	ground data system
GN	Ground Network
GSFC	Goddard Space Flight Center
IDEF0	Integration Definition for Function Modeling
IP	Internet Protocol
ISO	International Standards Organization
JAD	joint applications development
JPL	Jet Propulsion Laboratory
LAN	local area network
MO&DSD	Mission Operations and Data Systems Directorate
MOC	Mission Operations Center
MOT	Mission Operations Team
MSS	Mission-Specific Support
NCC	Network Control Center

NSSDC	National Space Science Data Center
OBE	onboard equivalent
PACE	PORTS Automated Configuration Environment Planning and Analysis Coordination Environment
Pacor	packet processor
PORTS	preliminary operations requirements and test support
Renaissance	Reusable Network Architecture for Interoperable Space Science, Analysis, Navigation, and Control Environments
RGS	Requirements Generation System
RT	Renaissance Team
SEF	Systems Engineering Facility
SIT	system implementation team
SMEX	Small Explorer
SMTP	Simple Mail Transfer Protocol
SN	Space Network
SOC	Science Operations Center
TBD	to be determined
UI	user interface
WAN	wide area network